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**A Survey of Sport Fishing in the
Illinois Portion of Lake Michigan**
Annual Report, F-52-R3

Center for Aquatic Ecology

William H. Horns

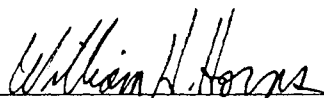
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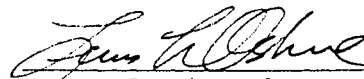
A SURVEY OF SPORT FISHING
IN THE ILLINOIS PORTION OF LAKE MICHIGAN
April 1988 through March 1989

William H. Horns
Center for Aquatic Ecology, Illinois Natural History Survey

Submitted to
Division of Fisheries, Illinois Department of Conservation
in fulfillment of the reporting requirements of
Federal Aid Project F-52-R3



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September 1989

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ABSTRACT

A survey of sport fishing in the Illinois portion of Lake Michigan was conducted between April 1, 1988, and March 31, 1989. The survey covered all sport fishing, with exception of fishing from chartered boats. It included angling by pedestrians, fishing from boats, smelt fishing, snagging, and ice fishing. The intent of the survey was to provide reliable estimates of sport fishing activity, sport fish harvest, expenditures for sport fishing, and quality of sport fishing. Estimated total fishing effort for all categories of fishing was 1.8 million angler-hours. The estimated total harvest included 1,838,000 yellow perch, 7,000 brown trout, 6,000 rainbow trout, 4,000 lake trout, 72,000 coho salmon, and 14,000 chinook salmon. Estimated expenditures for boats, motors, trailers, fishing gear, and automobile gas were \$17 million. The yield value of the sport fishing harvest was approximately \$3.4 million.

This survey was conducted under a memorandum of understanding between the Illinois Department of Conservation and the Board of Trustees of the University of Illinois. The research was performed by the Illinois Natural History Survey, a division of the Illinois Department of Energy and Natural Resources. The project was supported by funds made available through the Federal Aid in Sport Fish Restoration Act and administered by the Illinois Department of Conservation. The form and content of this report and the interpretations of the data are the responsibility of the University of Illinois and the Illinois Natural History Survey and not the Illinois Department of Conservation.

I INTRODUCTION

This report summarizes a survey of sport fishing in the Illinois portion of Lake Michigan between 1 April 1988 and 31 March 1989. The survey covered all types of sport fishing, with the exception of charter-boat fishing. It assessed fishing by pedestrians as well as boaters. This survey also covered smelt fishing, snagging, and ice fishing. The general intent of the project was to provide reliable estimates of sport fishing activity, sport fish harvest, expenditures for sport fishing, and quality of sport fishing. Results from the first three years of this series of annual surveys were reported elsewhere (Horns and Gorden 1986, Horns and Gorden 1988, Horns 1988). The most recent preceding creel survey of this type in Illinois was conducted in 1979 by Bruce Muench (Muench 1981).

Geographic Setting

The geographic setting of this survey is illustrated in Figure 1. The area under the jurisdiction of Illinois includes 63 miles of Lake Michigan shoreline. This area is highly developed and heavily industrialized. Chicago covers roughly one-third of the shoreline, and a series of smaller cities cover almost all of the remainder. This section of Lake Michigan lacks significant tributary streams. A geographic feature that influences the distribution and success of sport fishing is the slope of the near-shore lake bottom; the slope becomes progressively steeper as one moves from south to north. This progression means, for example, that boaters from Chicago must go considerably farther from shore to reach good salmon waters than boaters departing from Waukegan.

Distribution of Fishing

Pedestrians and launched boats

The survey recognized 27 fishing areas (Table 1). Helicopter flights on seven days in 1988 were used to determine the distribution of fishing. The 27 areas accounted for 94% of the pedestrian anglers observed in the aerial surveys and 99% of the boat trailers parked near launch areas. Boats launched from the Calumet Yacht Club (25 to 50 launches per week in mid summer) were not included in this survey. In this survey interviews were conducted at eight pedestrian fishing areas and four launch areas. The pedestrian areas (Waukegan Power Plant, Waukegan Harbor, Montrose Harbor, Diversey Harbor, Burnham Harbor, McCormick Place, Jackson Park, and Calumet Park) accounted for 68.4% of the pedestrian anglers observed during the helicopter flights. The four launch areas (Waukegan Harbor, Diversey Harbor, Burnham Harbor east ramp, and Calumet Park) accounted for 56.4% of the boat trailers observed near launch areas.

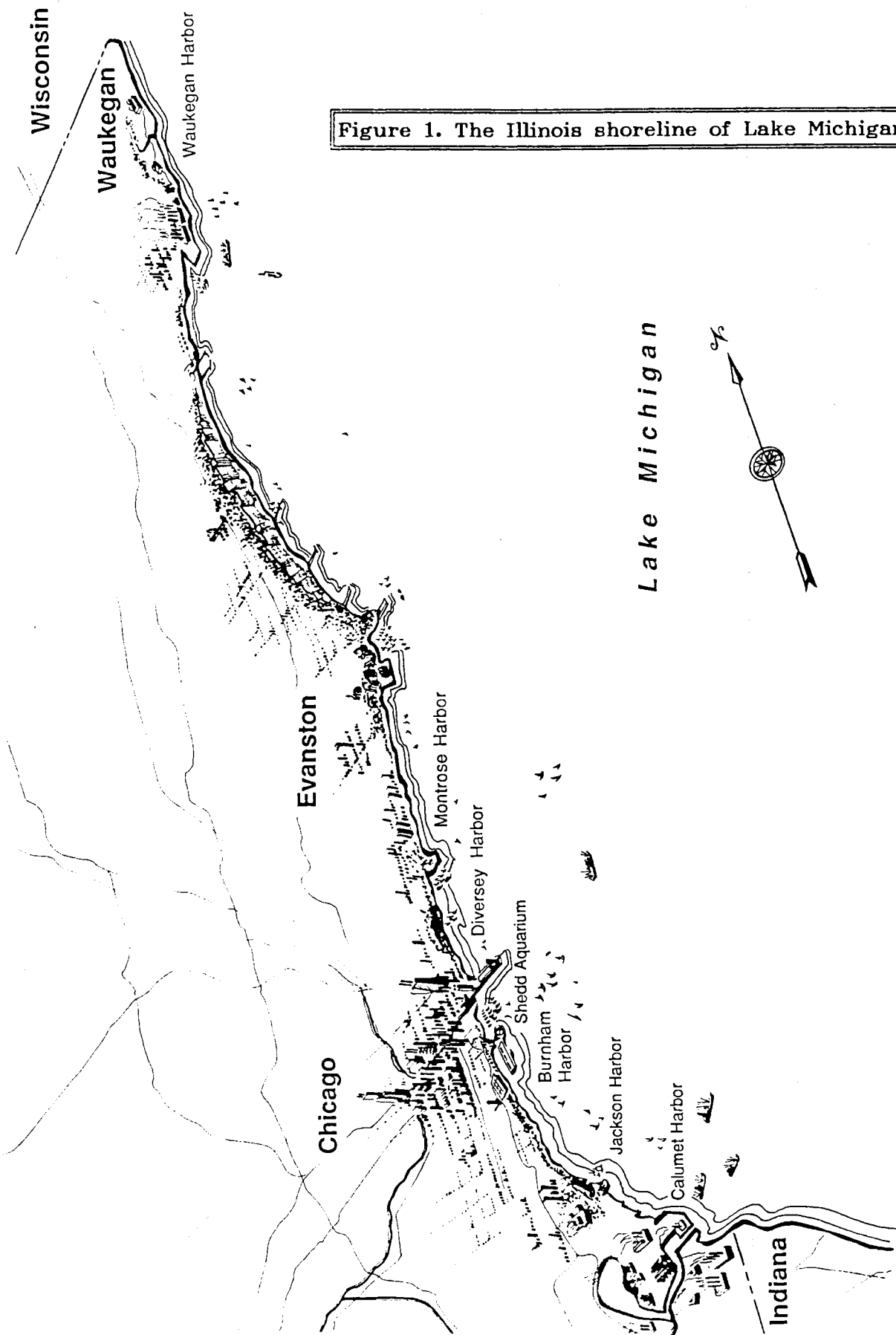


Figure 1. The Illinois shoreline of Lake Michigan.

Table 1. Distribution of pedestrian anglers and boat trailers (1988).

AREA	PEDESTRIAN ANGLERS (%)	BOAT TRAILERS (%)
1. Illinois Beach State Park	0.4	17.7
2. Waukegan Power Plant discharge and pier	3.3	0.0
3. Waukegan Harbor and breakwalls	11.0	32.2
4. Great Lakes Naval Training Station	2.8	2.7
5. Forest Park	0.5	2.7
6. Central Park	0.4	2.9
7. Winnetka (Lloyd and Tower Parks)	1.6	0.6
8. Wilmette Harbor	1.7	0.0
9. Northwestern Univ. and Dawes Park	1.4	5.2
10. Farwell Avenue pier	1.1	0.0
11. Hollywood Avenue pier	1.1	0.0
12. Foster Avenue pier	0.3	0.0
13. Wilson Avenue ramp	0.0	0.6
14. Montrose Harbor and breakwalls	33.1	0.0
15. Belmont Harbor	5.1	0.0
16. Diversey Harbor and breakwalls	4.5	9.9
17. North Avenue pier	0.5	0.0
18. Navy Pier	2.0	0.0
19. Monroe Street breakwalls	2.4	0.0
20. Burnham Harbor and vicinity	7.3	(E) 5.9 (W) 9.4
21. McCormick Place seawall	2.0	0.0
22. 31st Street pier	1.8	0.0
23. 50th Street access area	0.5	0.0
24. 59th Street Harbor	1.3	0.0
25. Jackson Park Harbor and breakwall	5.1	0.6
26. Rainbow Park	0.7	0.2
27. Calumet Park	2.1	8.4
28. other areas	6.0	1.1

Moored boats

The principal boat mooring areas are Waukegan Harbor, Great Lakes Naval Training Station, Wilmette Harbor, and the Chicago Park District harbors. This survey did not include boats kept at moorings or on land in the Calumet or Chicago river systems. In this survey we used the numbers of power boats kept at moorings as an index of fishing activity from moored non-charter power boats. Table 2 summarizes the distribution of moored power boats. Although some fishing occurs from sail boats, we assumed that it was a negligible portion of all fishing. The only private lift service that we included in the survey was that of Larsen Marine (referred to as I/O service in Table 2), which operates in Waukegan Harbor.

Table 2. Distribution of moored non-charter power boats.	
MOORING AREA	NUMBER OF POWER BOATS
Waukegan Harbor	581
Public Moorings	461
Larsen Marine I/O service	120
Great Lakes Naval Training Station	170
Wilmette Harbor	77
Chicago Park District	1830
Diversey	671
Burnham	479
other harbor moorings	680

Ice fishing

Ice fishing was confined to the following areas: Montrose Harbor, Belmont Harbor (the extreme northwest corner), Diversey Harbor (especially Lincoln Park lagoon), Navy Pier, Burnham Harbor, and Jackson Harbor (primarily the inner harbor).

Snagging

Legal snagging in 1988 was confined to five areas: Jackson Park inner and outer harbors, Lincoln Park lagoon, Winnetka Power Plant discharge area, Waukegan Harbor, and the Waukegan Power Plant discharge area. The snagging season ran from 1 October through 31 December. This survey did not attempt to assess the extent of illegal snagging.

Smelt fishing

The geographic distribution of smelt fishermen was probably similar to that of conventional pedestrian anglers. Most smelt fishermen in Illinois used small gill nets and preferred structures such as breakwalls and piers similar to those used by conventional anglers. Smelt fishing interviews in 1988 were conducted at Waukegan Harbor.

II METHODS

The following groups were considered separately: (1) Summer pedestrian and launched-boat anglers. These anglers could be studied directly through personal interviews and direct head counts conducted between 1 April and 30 September. (2) Anglers using moored boats. The data presented here are based entirely on extrapolations from estimates for anglers using launched boats. (3) Winter fishermen, including snaggers, ice fishermen, and conventional anglers. For this group information was obtained directly through interviews and counts of anglers between 1 October and 31 March. (4) Smelt fishermen were interviewed and counted in a survey that focused on Waukegan Harbor.

Summer Pedestrians and Launched-boat Anglers

The major work of this survey was the assessment of catch, effort, and expenditures by summer pedestrian and launched-boat anglers. Estimates were made for selected *primary fishing areas*, and those estimates were extrapolated to less heavily fished areas. For each primary fishing area, a stratified random sampling design similar to that suggested by Malvestuto (1983) was used. The fishing day was the primary sampling unit. Daily estimates of variables of interest (total catch by species, expenditures by category, etc.) for each primary site were combined to form seasonal estimates using the formula for stratified random samples given by Cochran (1977).

Use of primary fishing areas

The primary fishing areas for pedestrian anglers were Waukegan Power Plant, Waukegan Harbor, Montrose Harbor, Diversey Harbor, Burnham Harbor, McCormick Place, Jackson Park, and Calumet Park. The primary fishing areas for launched boats were Waukegan Harbor, Diversey Harbor, Burnham Harbor (east ramp), and Calumet Park. For each day of work, a creel clerk was assigned to visit three areas, two pedestrian areas and one launch area, in a prescribed order. The three areas were always one of four groups: (1) Waukegan Harbor (pedestrians), Waukegan Power Plant (pedestrians), Waukegan Harbor (launched boats); (2) Montrose Harbor (pedestrians), Diversey Harbor (pedestrians), Diversey Harbor (launched boats); (3) Burnham Harbor (pedestrians), McCormick Place (pedestrians), Burnham Harbor east ramp (launched boats); and (4) Jackson Park (pedestrians), Calumet Park (pedestrians), Calumet Park (launch ramps). The primary fishing areas accounted for 68.4% of pedestrian fishing and 56.4% of fishing from launched boats (Table 1). Estimates obtained for the primary fishing areas were extrapolated to all other areas based on the distributions of pedestrian anglers and boat trailers.

Selection of dates in a stratified random sample

The summer fishing season (1 April through 30 September 1988) was stratified by time period and type of day. Each date fell within one time period and was either a working day or a nonworking day (weekends and holidays). The following 16 strata were formed:

- | | |
|------------------------------|---------------------------------|
| 1. working days 4/1 - 4/23 | 2. nonworking days 4/1 - 4/23 |
| 3. working days 4/24 - 5/14 | 4. nonworking days 4/24 - 5/14 |
| 5. working days 5/15 - 6/4 | 6. nonworking days 5/15 - 6/4 |
| 7. working days 6/5 - 6/25 | 8. nonworking days 6/5 - 6/25 |
| 9. working days 6/26 - 7/16 | 10. nonworking days 6/26 - 7/16 |
| 11. working days 7/17 - 8/6 | 12. nonworking days 7/17 - 8/6 |
| 13. working days 8/7 - 8/27 | 14. nonworking days 8/7 - 8/27 |
| 15. working days 8/28 - 9/17 | 16. nonworking days 8/28 - 9/17 |
| 17. working days 9/18 - 9/30 | 18. nonworking days 9/18 - 9/30 |

Within each stratum dates were selected at random. This sampling process was conducted separately for each of the four groups of three areas. Three dates were selected from each stratum except 17 and 18; in those strata, which were several days shorter than the others, fewer than three dates were selected for each group of areas. All areas in each group were visited on the dates selected for that group.

Data collection

Data collection at pedestrian fishing areas consisted of counting all pedestrian anglers at the start and finish of a two-hour interview period and interviewing a representative sample of anglers during the two hours. For four of the primary pedestrian areas (Waukegan Harbor, Montrose Harbor, Burnham Harbor, and Jackson Park) the interview period was always 6:00 a.m. to 8:00 a.m.; for the other four (Waukegan Power Plant, Diversey Harbor, McCormick Place, and Calumet Park) the interview period was always 8:30 a.m. to 10:30 a.m. Each interview was designed for one angling party (i.e., one or more anglers fishing together) rather than for one individual angler. At launch ramps the number of angling boats returning to the ramp between 11:00 a.m. and 1:00 p.m. were counted and a representative sample of all returning fishing parties were interviewed.

The interviewers (referred to as creel clerks) gathered information related to effort (number of angler-hours, number of angler-trips), expenditures for the present fishing trip (by category: major = boat, motor, or trailer; minor = fishing gear; other = auto gas @ 10 cents per mile), species sought, and catch (by species). They also weighed and measured fish in possession of the anglers and noted clipped fins. The data form and instructions to creel clerks are reproduced in Appendix A.

Variables measured for each date

The data collected in the interviews on one date at one area were reduced to a set of variables describing daily fishing activity: (1) *Catch per angler-hour* was determined for each species and was the number of fish caught by all parties interviewed divided by the number of hours of fishing by individuals in those parties. (2) *Expenditures per angler-trip* was determined in each of three categories (major, minor, and other) and equalled total expenditures divided by the number of anglers interviewed. (3) *Angler-hours* (i.e., total time spent fishing by all anglers) and (4) *angler-trips* (i.e., total number of anglers who fished) were determined differently for

pedestrians and boaters. For pedestrians, angler-hours was the average number of anglers (at start and finish of interviews) multiplied by the number of hours in the day (from 0.5 hour before sunrise to 0.5 hour after sunset), and angler-trips was angler-hours divided by the average duration of a pedestrian fishing trip (4.31 hours for all interviews with conventional pedestrian anglers during the 1987 survey). The number of fishing boats launched for the day was estimated by multiplying the number of fishing boats landing during the two-hour interview period by the estimated average ratio of the number of all boats returning in a day to the number returning between 11:00 a.m. and 1:00 p.m. That ratio was estimated to be 3.13 by monitoring all boat traffic at one of three launch ramps on 47 days in 1985, 1986, 1987, and 1988. Angler-trips was then estimated as the total number of boats launched for the day multiplied by the average number of anglers per boat (2.77, based on data from 1987). Angler-hours was taken as angler-trips multiplied by the yearly average number of hours per angling trip by boaters (5.25, based on data from 1987). (5) *Catch* was determined for each species as catch per angler-hour multiplied by angler-hours, and (6) *expenditures* was determined for each category as expenditures per angler-trip multiplied by angler-trips.

Expansion of daily estimates

The formula given by Cochran (1977) for stratified random samples was employed to expand the daily estimates to form seasonal area-specific estimates of effort, catch, and expenditures.

Seasonal averages of catch per angler-hour were obtained for each primary fishing area by taking unweighted averages of daily values. In these calculations, seasonal averages for yellow perch included only data from anglers who were fishing for perch, and seasonal averages for salmonids included only data from anglers who were fishing for salmonids.

Extrapolation to other areas

Extrapolations of seasonal estimates for primary fishing areas to other areas were based on the distributions of pedestrian anglers and boat trailers (Table 1). The distribution of boat trailers was assumed to reflect the distribution of launched-boat anglers. In the extrapolations, catch, effort, and expenditures at areas not visited were estimated by extension of results for the nearest primary fishing areas. Thus, for pedestrian anglers, results for Waukegan Harbor were extended to all other areas (except Waukegan Power Plant) north of and including Wilmette Harbor; results for Montrose Harbor were extended to all remaining areas north of Diversey Harbor; results for Diversey Harbor were extended to all remaining areas north of the Monroe Street breakwalls; results for Burnham Harbor were extended to all remaining areas north of McCormick Place, including the west ramp in Burnham Harbor; results for McCormick Place were extended to all remaining areas north of 31st Street; results from Jackson Park were extended to all remaining areas north of Rainbow Park; and results from Calumet Park were extended to all remaining areas south of (and including) Rainbow Park. For launched boats, results for Waukegan Harbor were extended to all launch ramps north of Wilmette (including the "other" areas listed in Table 1); results for Diversey

were extended to Dawes Park and the Wilson Avenue ramps; results for Burnham Harbor east ramp were extended to Burnham Harbor west ramp; and results for Calumet Park were extended to ramps at 59th Street Harbor, Jackson Park, and Rainbow Park.

Moored Boats

To estimate effort, catch, and expenditures by anglers using moored boats, estimates for launched boats were extrapolated. First, the ratios of moored fishing boats to launched fishing boats for Waukegan Harbor, Diversey Harbor, and Burnham Harbor (east ramp) were estimated. On several dates during the summers of 1987 and 1988 counts were made of the numbers of fishing boats returning to moorings and to Larsen Marine I/O service at Waukegan Harbor while simultaneous counts were made of the number of fishing boats returning to the launch ramp. Charter boats were excluded from the counts. The ratio of moored to launched boats was 0.83 in Waukegan Harbor. In similar series of counts, the ratios were 0.92 in Diversey Harbor and 1.38 in Burnham Harbor (east ramp). Using these figures, seasonal estimates of effort, catch, and expenditures by anglers using launched boats at Waukegan, Diversey, and Burnham harbors were extrapolated to moored boats. Thus, for example, the moored boat catch at Waukegan Harbor for a given time period was estimated to be the launched boat catch for that time period multiplied by 0.83. Values so derived for Waukegan, Diversey, and Burnham harbors were then extrapolated to other moored boats based on the distribution of moored power boats (Table 2). Estimates for Waukegan Harbor were extrapolated to boats moored in Wilmette Harbor and Great Lakes Naval Training Station, and the combined estimates for Diversey Harbor and Burnham Harbor were extrapolated to all other boats moored in Chicago.

Winter Fishing

Winter fishing comprised snagging, ice fishing, and conventional angling (mostly occurring at power plant discharge areas). During the winter months (October through March) the following nine areas were visited weekly for counts of each type of fisherman and for interviews:

Waukegan Power Plant	Waukegan Harbor
Winnetka Power Plant	Montrose Harbor
Belmont Harbor	Diversey Harbor
Navy Pier	Burnham Harbor
Jackson Park	

This list includes all legal snagging areas, all ice-fishing areas, and all other areas fished by conventional anglers to any significant extent during winter. Creel clerks used the form and procedures outlined in Appendix A.

From 1 October 1988 through 31 March 1989, all areas were scheduled for weekly visits on a Saturday or a Sunday. All areas were visited during daylight hours. The times of counts and interviews were uncontrolled and depended on the pace at which creel clerks were able to complete their work. Daily estimates for catch, expenditures, and effort for each area were derived as described above for the summer survey except that different values for average fishing-trip length were used for snaggers and ice fishermen. Those

averages (derived from interviews conducted in the winter of 1987-88) were 4.49 hours for snaggers and 4.99 hours for ice fishermen. The daily estimates were treated as a random sample from all weekend days and holidays during the snagging season, and seasonal weekend-holiday totals were estimated accordingly. Work-day totals were estimated by extrapolation; the summer ratio of average work-day pedestrian fishing activity (estimated man-hours of fishing) to average weekend-holiday pedestrian fishing activity was used as the basis for the extrapolation.

Smelt Fishing

Our data collection was confined to Waukegan Harbor. Waukegan Harbor probably accounts for about the same fraction of Illinois' total smelt fishing in Illinois as of total conventional pedestrian angling (11%, Table 1). Nine dates during the smelt season (1 April through 15 May) were selected randomly, and on each selected date one clerk was assigned to cover Waukegan Harbor. Data collection was similar to that described above for conventional pedestrian anglers, except that initial counts of smelt fishermen were made at 9:30 p.m. and interviews were conducted after that. Creel clerks used the form and procedures used in other interviews, with two differences: the smelt in possession of fishermen were not weighed or measured and "major expenditures" here meant expenditures for food and drink, not for boats, motors, and trailers, as elsewhere.

Daily estimates of effort (angler-hours) were derived by multiplying the number of fishermen by 4.0 hours (approximately the average trip length). Daily catch estimates were derived by multiplying angler-hours by catch per angler-hour for the day in question. Daily estimates from the nine dates were extrapolated directly to the entire 45-day smelt season.

Yield Values

Here the term *yield value* means the hypothetical market price of the sport fish harvest. For salmonids, approximate market prices of whole fish, headed and gutted were used. For yellow perch market prices of fillets were used. The estimated catch for each species was multiplied by the average individual weight of fish weighed in our survey. That estimated harvested round weight was then multiplied by a factor to estimate the harvested market weight. For salmonids, the factor was 0.75 because approximately 25% of the weight of a salmonid is in the head and viscera. For yellow perch the factor was 0.40 because approximately 60% of the fish is wasted in the filleting process. Total harvested marketable weight was then multiplied by approximate market prices (Table 9).

Missing Data

On some dates creel clerks were unable to complete their assigned interviews. When data were missing from some but not all of the assigned dates in a stratum, estimates for the stratum were based on data from the completed dates. No special formula was used, but the sample size was smaller than for strata where all interviews were completed.

III RESULTS

All estimates derived in this survey are often given here without qualification; for simplicity of expression, the word "approximately" is not repeated with each estimated value. Estimates are rounded in the following paragraphs.

Total fishing effort (excluding smelt fishing) in the Illinois portion of Lake Michigan during the study period was 1.8 million angler-hours, with 62% of that attributable to summer pedestrian anglers. Anglers caught 1,838,000 yellow perch, 7,000 brown trout, 6,000 rainbow trout, 4,000 lake trout, 72,000 coho salmon, and 14,000 chinook salmon. Approximately 660,000 smelt were caught. Expenditures for boats, motors, trailers, fishing gear, and automobile gas used on Lake Michigan fishing trips were \$17 million. The yield value of the Illinois sport fishing harvest was \$3.4 million.

Detailed results are presented in Tables 3 - 11. Tables 3 and 4 summarize all expenditure, catch, and effort estimates. Tables 5a, 5b, and 6 list seasonal catch and effort estimates for pedestrians and anglers using launched boats. Tables 7a, 7b, and 8 present catch rates for pedestrians and launched boaters. Table 9 provides yield values. Tables 10a and 10b present average weights of the six most important species, with separate estimates given for the catch of boaters, pedestrians, snaggers, and ice fishermen. Fin clips observed by our creel clerks are listed in Tables 11a and 11b, with the number of occurrences of each clip or clip combination listed by season and angler type.

Summer Pedestrian Fishing

During the summer of 1988, pedestrian anglers made nearly 250,000 trips to Lake Michigan and spent 1.1 million hours fishing. Yellow perch was the predominant species in their catch, with a harvest of 1,637,000 fish. Montrose Harbor was the most productive area, with 32% of the summer harvest of yellow perch by pedestrians, although catch rates by anglers fishing for yellow perch at Waukegan Harbor often exceeded those at Montrose Harbor during the mid-summer period of best fishing for yellow perch. Coho salmon was the next most important species for summer pedestrians, with a catch of 17,577. Pedestrian anglers spent \$1,133,000 (\$4.53 per trip) for fishing gear and \$417,000 (\$1.67 per trip) for automobile gas.

Fishing by Boaters Using Launched Boats

Anglers who used launched boats made over 58,000 trips to Lake Michigan and spent 305,000 hours fishing. The most abundant species in their catch were yellow perch (74,000), coho salmon (32,000) and chinook salmon (4,000). For Pacific salmon, Waukegan Harbor was the most productive of the four primary launch areas, accounting for 49% of the coho salmon and 43% of the chinook salmon taken by anglers who used launched boats. Expenditures by anglers using launched boats reached nearly \$9,000,000 (\$152 per trip), with over 80% of that amount going for boats, motors, and trailers.

Fishing by Boaters Using Moored Boats

Our estimates for boaters using boats kept at moorings were derived by extrapolation from estimates for boaters using launched boats. This group of anglers caught 21,000 coho salmon and 2,000 chinook salmon, and spent nearly \$6,000,000 for boats, motors, trailers, fishing gear, and automobile gas (we do not include mooring costs here).

Winter Fishing

Snaggers caught 296 rainbow trout, 633 cohos, and over 3,000 chinook salmon in 67,000 hours of fishing. They spent \$146,000 (\$9.71 per trip). Ice fishermen caught 41,000 yellow perch, 75 brown trout, and 243 rainbow trout, while spending only \$45,000 (\$8.72 per trip). During winter, conventional anglers were most active at the Waukegan Power Plant discharge and, during late fall of 1988 and very early spring of 1989, at Montrose Harbor. They caught 889 coho salmon, 826 chinook salmon, 69 lake trout, 699 brown trout, and 1,087 rainbow trout in 87,000 hours of fishing, and spent \$142,000 (\$7.03 per trip).

Smelt Fishing

We estimated that smelt fishermen at Waukegan Harbor caught 72,955 smelt while fishing 10,620 hours on 2,655 fishing trips. If smelt fishing at Waukegan Harbor represents 11% of the total in Illinois waters of Lake Michigan (the proportion of conventional pedestrian angling occurring at Waukegan Harbor, Table 1) and if catch rates were similar at other sites, then the total harvest of smelt was approximately 660,000 and the total smelt-fishing effort exceeded 24,000 angler-trips occupying nearly 100,000 hours. We have estimated that smelt fishermen spend approximately \$6.31 per angler-trip (Horns and Gorden 1988), so total expenditures for smelt fishing was approximately \$150,000.

Yield Values

The estimated yield values of the three most popular sport species were \$1,455,000 (yellow perch), \$1,121,000 (coho salmon), and \$610,000 (chinook salmon).

Minor Species

In addition to smelt and the species for which results are presented in detail in Tables 3-11, creel clerks reported several other species of fish in possession of pedestrian anglers: **brook trout** (1 from the Waukegan Power Plant discharge channel, 4 from the adjoining beach area, 2 from the breakwall at Waukegan Harbor, 1 from Jackson Harbor, and 3 from the sea wall at McCormick Place); **smallmouth bass** (1 from Jackson Harbor and 1 from Diversey Harbor); **common carp** (2 from the Waukegan Power Plant discharge channel, 1 from Calumet Park, and 1 from Jackson Park Harbor); **bluegill sunfish** (2 from the Shedd Aquarium vicinity, and 1 each from Diversey Harbor, Montrose Harbor, and the Waukegan Harbor breakwall); **rock bass** (1 from Burnham Harbor, 1 from the Shedd Aquarium vicinity, and 1 from Diversey Harbor); unspecified **crappie** (1 from Burnham Harbor); **channel catfish** (1 from Jackson

Park Harbor); **drum** (1 from the sea wall at McCormick Place and 1 from Calumet Park); **white sucker** (1 from the Waukegan Power Plant discharge channel); unspecified **bullhead** (3 from Burnham Harbor and 1 each from Montrose Harbor and Diversey Harbor); **largemouth bass** (1 from outside Diversey Harbor); unspecified **shad** (1 from the mouth of Diversey Harbor); unspecified **bass** (1 from Diversey Harbor); and unspecified **sculpin** (1 from Calumet Park). Anglers also caught alewives for use as bait.

Table 3. Effort and expenditures (smelt-fishermen excluded).

TYPE OF ANGLER		EFFORT	EXPENDITURES		
	AREA	(angler-trips)	major (boat etc)	minor (gear)	other (travel)
SUMMER (4/1-9/30)					
Pedestrians	Wau.Power	10,583	\$0	\$33,211	\$30,350
	Wau.Harbor	31,374	\$0	\$108,536	\$56,894
	Montrose	77,041	\$0	\$465,605	\$122,632
	Diversey	11,530	\$0	\$35,055	\$12,630
	Burnham	16,994	\$0	\$62,211	\$26,631
	McCormick	4,899	\$0	\$22,164	\$6,435
	Jackson	6,737	\$0	\$27,627	\$6,020
	Calumet	7,152	\$0	\$26,713	\$13,020
	other	83,941	\$0	\$351,871	\$142,170
	TOTALS	250,251	\$0	\$1,133,004	\$416,961
Launched boats	Waukegan	20,757	\$2,805,069	\$210,470	\$52,495
	Diversey	4,411	\$1,114,516	\$75,281	\$5,195
	Burnham	2,319	\$251,107	\$14,690	\$3,661
	Calumet	5,833	\$387,105	\$59,550	\$7,039
	others	24,690	\$3,502,941	\$254,236	\$54,706
	TOTALS	58,009	\$8,060,739	\$614,227	\$123,096
Moored Boats	TOTALS	36,162	\$5,506,033	\$391,888	\$77,949
WINTER					
Pedestrians (10/1-3/31)	Wau.Power	4,635	\$0	\$27,468	\$15,457
	Wau.Harbor	2,101	\$0	\$5,539	\$5,576
	Winnetka	509	\$0	\$2,128	\$731
	Montrose	3,044	\$0	\$12,732	\$4,435
	Belmont	1,371	\$0	\$4,357	\$1,861
	Diversey	458	\$0	\$1,981	\$337
	Navy Pier	751	\$0	\$8,068	\$1,122
	Burnham	1,658	\$0	\$7,390	\$2,529
	Jackson	414	\$0	\$4,242	\$931
	others	5,196	\$0	\$24,492	\$10,151
TOTALS	20,137	\$0	\$98,396	\$43,130	
Snaggers (10/1-12/31)	Wau.Power	1,800	\$0	\$10,454	\$15,299
	Wau.Harbor	2,726	\$0	\$3,230	\$13,815
	Winnetka	0	\$0	\$0	\$0
	Diversey	5,404	\$0	\$51,134	\$7,186
	Jackson	5,077	\$0	\$37,364	\$7,253
	TOTALS	15,007	\$0	\$102,182	\$43,552
Ice fishermen (12/1-2/29)	Montrose	677	\$0	\$1,063	\$771
	Belmont	1,623	\$0	\$6,174	\$2,546
	Diversey	410	\$0	\$75	\$200
	Navy Pier	0	\$0	\$0	\$0
	Burnham	2,409	\$0	\$29,508	\$4,298
	Jackson	0	\$0	\$0	\$0
	TOTALS	5,119	\$0	\$36,820	\$7,815
GRAND TOTALS		384,685	\$13,566,772	\$2,376,518	\$712,504

Table 4. Effort and catch (smelt-fishermen excluded).

TYPE OF ANGLER and AREA		EFFORT (angler- hours)	CATCH					
			yellow perch	brown trout	r'bow trout	lake trout	coho salm'	chin salm'
SUMMER (4/1-9/30)								
Peds	Wau.Pow.	45,613	42,878	1,879	495	16	995	150
	Wau.Har.	135,222	234,490	375	595	0	5,619	907
	Montrose	332,047	520,713	149	22	0	3,859	1,114
	Diversey	49,696	62,925	155	0	0	245	109
	Burnham	72,730	143,109	0	104	0	119	183
	McCorm.	21,117	28,281	11	80	0	55	22
	Jackson	29,036	40,763	0	0	0	116	0
	Calumet	30,826	22,342	33	31	0	92	31
	other	361,531	541,484	2,309	1,020	16	6,477	1,298
	TOTALS	1,077,816	1,636,985	4,912	2,346	33	17,577	3,815
Lau'd	Waukeg.	108,974	9,887	420	617	760	15,720	1,513
	Diversey	23,159	6,352	15	91	312	941	197
	Burnham	12,172	6,875	0	25	72	220	70
	Calumet	30,621	25,296	29	170	84	648	227
	others	129,622	25,589	373	641	959	14,487	1,549
	TOTALS	304,547	73,999	836	1,545	2,188	32,016	3,556
Moo'd	TOTALS	189,847	36,044	520	922	1,516	20,530	2,237
WINTER (see dates in Table 3)								
Peds	Wau.Pow.	19,977	582	672	608	69	71	46
	Wau.Har.	9,054	0	0	53	0	145	270
	Winnetka	2,195	0	0	38	0	0	0
	Montrose	13,118	8,434	13	39	0	0	63
	Belmont	5,907	10,118	0	0	0	492	62
	Diversey	1,976	0	0	0	0	23	0
	Navy Pr	3,236	6,218	10	42	0	0	0
	Burnham	7,145	11,124	0	124	0	15	75
	Jackson	1,786	0	0	0	0	0	0
	others	22,396	13,725	3	183	0	144	310
	TOTALS	86,792	50,200	699	1,087	69	889	826
Snag	Wau.Pow.	8,083	0	0	18	0	0	505
	Wau.Har.	12,238	0	0	0	0	143	468
	Winnetka	0	0	0	0	0	0	0
	Diversey	24,263	0	0	0	0	433	1,533
	Jackson	22,796	0	0	278	0	56	902
	TOTALS	67,381	0	0	296	0	633	3408
Ice	Montrose	3,375	4,952	0	0	0	0	0
	Belmont	8,101	19,566	0	0	0	0	0
	Diversey	2,047	0	0	168	0	0	0
	Navy Pr	0	0	0	0	0	0	0
	Burnham	12,023	16,596	75	75	0	0	0
	Jackson	0	0	0	0	0	0	0
	TOTALS	25,546	41,114	75	243	0	0	0
GRAND TOTALS		1,751,929	1,838,341	7,043	6,439	3,805	71,645	13,841

Table 5a. Effort and catch by pedestrian anglers (northern areas).

TIME PERIOD	AREA	EFFORT (angler-hours)	CATCH					
			yellow perch	brown trout	r'bow trout	lake trout	coho salm'	chin salm'
4/1-	Wau'Power	11,691	0	1,134	354	0	648	0
4/23	Wau'Harbor	9,122	0	157	94	0	3,473	40
	Montrose	21,038	87	149	22	0	3,346	0
	Diversey	1,737	0	0	0	0	166	0
	others	25,437	25	1,502	423	0	4,173	28
4/24-	Wau'Power	5,221	0	311	41	0	241	0
5/14	Wau'Harbor	10,268	0	0	65	0	1,713	0
	Montrose	22,280	3,720	0	0	0	512	581
	Diversey	4,356	4,113	22	0	0	42	0
	others	21,938	3,923	326	86	0	1,620	170
5/15-	Wau'Power	2,656	0	70	75	0	36	0
6/4	Wau'Harbor	15,867	15,561	0	260	0	71	0
	Montrose	51,362	94,596	0	0	0	0	0
	Diversey	7,361	6,855	22	0	0	0	0
	others	33,886	43,337	85	257	0	86	0
6/5-	Wau'Power	3,587	9,016	0	0	0	0	0
6/25	Wau'Harbor	20,404	43,124	0	0	0	0	0
	Montrose	58,606	137,813	0	0	0	0	0
	Diversey	11,234	20,428	35	0	0	0	0
	others	42,783	93,662	24	0	0	0	0
6/26-	Wau'Power	7,245	20,697	28	0	0	0	0
7/16	Wau'Harbor	19,853	107,092	50	0	0	50	0
	Montrose	87,828	214,661	0	0	0	0	0
	Diversey	12,420	26,108	76	0	0	0	0
	others	58,236	176,554	115	0	0	35	0
7/17-	Wau'Power	3,398	11,896	0	0	0	0	0
8/6	Wau'Harbor	23,325	60,301	0	153	0	0	0
	Montrose	37,592	38,204	0	0	0	0	0
	Diversey	3,886	1,450	0	0	0	0	0
	others	33,419	66,301	0	107	0	0	0
8/7-	Wau'Power	3,560	980	0	22	0	0	14
8/27	Wau'Harbor	14,901	8,127	168	0	0	330	57
	Montrose	28,091	29,317	0	0	0	0	0
	Diversey	3,276	3,465	0	0	0	0	0
	others	24,479	17,651	18	22	0	230	54
8/28-	Wau'Power	3,788	225	51	0	0	65	65
9/17	Wau'Harbor	10,710	285	0	0	0	164	473
	Montrose	19,596	1,338	0	0	0	0	33
	Diversey	3,121	505	0	0	0	16	88
	others	19,278	1,165	51	0	0	191	466
9/18-	Wau'Power	4,467	60	71	5	16	5	71
9/30	Wau'Harbor	6,773	0	0	25	0	115	339
	Montrose	5,654	978	0	0	0	0	500
	Diversey	2,305	0	0	0	0	21	21
	others	12,453	347	71	23	16	101	469

Table 5b. Effort and catch by pedestrian anglers (southern areas).

TIME PERIOD	AREA	EFFORT (angler-hours)	CATCH					
			yellow perch	brown trout	r'bow trout	lake trout	coho salm'	chin salm'
4/1-	Burnham	4,880	0	0	104	0	119	0
4/23	McCormick	527	0	0	0	0	0	8
	Jackson	786	0	0	0	0	116	0
	Calumet	3,222	0	0	15	0	92	15
	others	4,638	0	0	57	0	221	5
4/24-	Burnham	2,098	32	0	0	0	0	0
5/14	McCormick	333	0	0	0	0	0	0
	Jackson	1,318	2,522	0	0	0	0	0
	Calumet	2,412	60	0	0	0	0	0
	others	3,503	2,903	0	0	0	0	0
5/15-	Burnham	7,409	11,298	0	0	0	0	0
6/4	McCormick	2,085	2,668	0	13	0	0	0
	Jackson	3,281	4,140	0	0	0	0	0
	Calumet	3,421	10,529	0	0	0	0	0
	others	9,568	15,124	0	6	0	0	0
6/5-	Burnham	14,214	37,374	0	0	0	0	0
6/25	McCormick	4,119	8,088	0	0	0	0	0
	Jackson	7,526	20,346	0	0	0	0	0
	Calumet	7,293	5,014	33	15	0	0	0
	others	20,058	47,284	11	5	0	0	0
6/26-	Burnham	17,724	36,908	0	0	0	0	0
7/16	McCormick	5,014	8,486	0	15	0	0	0
	Jackson	5,717	10,472	0	0	0	0	0
	Calumet	3,265	1,179	0	0	0	0	0
	others	18,838	34,747	0	8	0	0	0
7/17-	Burnham	9,745	30,758	0	0	0	0	0
8/6	McCormick	3,849	3,068	0	25	0	0	0
	Jackson	3,111	457	0	0	0	0	0
	Calumet	3,504	1,424	0	0	0	0	0
	others	11,436	17,697	0	12	0	0	0
8/7-	Burnham	10,939	25,507	0	0	0	0	0
8/27	McCormick	1,767	5,380	0	0	0	0	12
	Jackson	4,300	2,654	0	0	0	0	0
	Calumet	4,662	4,022	0	0	0	0	0
	others	12,722	19,628	0	0	0	0	6
8/28-	Burnham	2,848	1,201	0	0	0	0	88
9/17	McCormick	2,638	557	11	27	0	55	0
	Jackson	1,846	0	0	0	0	0	0
	Calumet	2,235	113	0	0	0	0	15
	others	5,568	909	5	14	0	27	49
9/18-	Burnham	2,874	32	0	0	0	0	95
9/30	McCormick	786	35	0	0	0	0	11
	Jackson	1,151	172	0	0	0	0	0
	Calumet	814	0	0	0	0	0	0
	others	3,390	228	0	0	0	0	52

Table 6. Effort and catch by anglers using launched boats.

TIME PERIOD	AREA	EFFORT (angler-hours)	CATCH					
			yellow perch	brown brown	r'bow trout	lake trout	coho salm'	chin salm'
4/1-	Waukegan	6,973	0	59	0	0	3508	12
4/23	Diversey	9,894	0	9	0	0	449	28
	Burnham	1,747	0	0	0	0	72	0
	Calumet	3,900	0	0	81	0	347	44
	others	14,950	0	57	8	0	3,428	31
4/24-	Waukegan	13,463	0	41	17	0	7,136	170
5/14	Diversey	1,051	0	0	0	0	78	43
	Burnham	1,783	19	0	0	0	20	23
	Calumet	5,485	3,583	29	0	0	160	61
	others	15,560	372	38	15	0	6,232	214
5/15-	Waukegan	28,872	0	50	145	81	3,769	117
6/4	Diversey	3,111	929	0	0	7	174	61
	Burnham	1,876	435	0	16	0	56	8
	Calumet	4,352	4,115	0	80	0	63	0
	others	30,062	1,630	43	158	74	3,439	149
6/5-	Waukegan	12,500	4,051	26	19	140	603	180
6/25	Diversey	2,046	1,570	0	31	36	138	9
	Burnham	2,865	3,906	0	9	72	66	10
	Calumet	4,138	4,306	0	0	41	50	6
	others	16,910	11,037	22	49	261	710	176
6/26-	Waukegan	8,783	5,389	0	144	172	89	96
7/16	Diversey	2,190	2,611	0	22	119	78	10
	Burnham	939	902	0	0	0	0	19
	Calumet	1,793	1,930	0	0	0	0	0
	others	10,505	7,787	0	137	217	122	118
7/17-	Waukegan	10,544	320	109	163	173	134	301
8/6	Diversey	1,942	664	0	18	145	0	5
	Burnham	1,295	573	0	0	0	5	5
	Calumet	2,775	2,688	0	0	0	0	0
	others	12,536	1,834	94	150	233	124	270
8/7-	Waukegan	13,692	112	15	113	128	175	378
8/27	Diversey	1,293	577	5	20	5	16	11
	Burnham	369	1,039	0	0	0	0	5
	Calumet	5,563	8,652	0	9	43	28	18
	others	13,655	2,914	16	110	117	163	341
8/28-	Waukegan	9,492	15	59	11	11	201	179
9/17	Diversey	1,079	0	0	0	0	0	12
	Burnham	539	0	0	0	0	0	0
	Calumet	1,510	21	0	0	0	0	64
	others	9,800	15	51	10	9	173	167
9/18-	Waukegan	4,653	0	61	5	55	105	80
9/30	Diversey	553	0	0	0	0	9	18
	Burnham	760	0	0	0	0	0	0
	Calumet	1,106	0	0	0	0	0	34
	others	5,644	0	52	4	47	96	83

Table 7a. Catch rates by pedestrian anglers (northern areas). For yellow perch, only data from anglers fishing for yellow perch were used. For the five salmonid species, only data from anglers fishing for salmonids were used. Asterisks represent instances when creel clerks found no anglers fishing for the species in question.

TIME PERIOD	AREA	CATCH PER ANGLER-HOUR					
		yellow perch	brown trout	rainbow trout	lake trout	coho salmon	chinook salmon
4/1-	Wau' Power	*	0.111	0.028	0.000	0.107	0.000
4/23	Wau' Harbor	0.000	0.014	0.004	0.000	0.467	0.006
	Montrose	2.927	0.006	0.000	0.000	0.251	0.000
	Diversey	0.000	0.000	0.000	0.000	0.117	0.000
4/24-	Wau' Power	*	0.057	0.009	0.000	0.054	0.000
5/14	Wau' Harbor	0.000	0.000	0.008	0.000	0.218	0.000
	Montrose	0.793	0.000	0.000	0.000	0.077	0.018
	Diversey	0.783	0.000	0.000	0.000	0.000	0.000
5/15-	Wau' Power	0.000	0.316	0.000	0.000	0.267	0.000
6/4	Wau' Harbor	1.462	0.000	0.000	0.000	0.070	0.000
	Montrose	1.514	0.000	0.000	0.000	0.000	0.000
	Diversey	1.395	*	*	*	*	*
6/5-	Wau' Power	2.366	0.000	0.000	0.000	0.000	0.000
6/25	Wau' Harbor	1.718	0.000	0.000	0.000	0.000	0.000
	Montrose	2.118	*	*	*	*	*
	Diversey	1.794	*	*	*	*	*
6/26-	Wau' Power	2.413	*	*	*	*	*
7/16	Wau' Harbor	2.939	0.000	0.000	0.000	0.000	0.000
	Montrose	2.292	*	*	*	*	*
	Diversey	2.132	*	*	*	*	*
7/17-	Wau' Power	2.638	0.000	0.000	0.000	0.083	0.000
8/6	Wau' Harbor	2.621	*	*	*	*	*
	Montrose	0.833	*	*	*	*	*
	Diversey	0.363	*	*	*	*	*
8/7-	Wau' Power	0.640	0.000	0.000	0.000	0.000	0.000
8/27	Wau' Harbor	0.617	0.019	0.000	0.000	0.008	0.013
	Montrose	1.168	0.000	0.000	0.000	0.000	0.000
	Diversey	1.007	0.000	0.000	0.000	0.000	0.000
8/28-	Wau' Power	0.726	0.011	0.000	0.000	0.009	0.009
9/17	Wau' Harbor	1.371	0.000	0.000	0.000	0.012	0.046
	Montrose	0.162	0.000	0.000	0.000	0.000	0.003
	Diversey	0.495	0.000	0.000	0.000	0.005	0.019
9/18-	Wau' Power	*	0.010	0.001	0.004	0.001	0.010
9/30	Wau' Harbor	0.000	0.000	0.004	0.000	0.012	0.051
	Montrose	9.429	0.000	0.000	0.000	0.000	0.098
	Diversey	*	0.000	0.000	0.000	0.016	0.016

Table 7b. Catch rates by pedestrian anglers (southern areas). For yellow perch, only data from anglers fishing for yellow perch were used. For the five salmonid species, only data from anglers fishing for salmonids were used. Asterisks represent instances when creel clerks found no anglers fishing for the species in question.

TIME PERIOD	AREA	CATCH PER ANGLER-HOUR					
		yellow perch	brown trout	rainbow trout	lake trout	coho salmon	chinook salmon
4/1-	Burnham	*	0.000	0.006	0.000	0.022	0.000
4/23	McCormick	0.000	0.000	0.000	0.000	0.000	0.000
	Jackson	*	0.000	0.000	0.000	0.086	0.000
	Calumet	0.000	0.000	0.003	0.000	0.006	0.003
4/24-	Burnham	0.060	0.000	0.000	0.000	0.000	0.000
5/14	McCormick	0.000	0.000	0.000	0.000	0.000	0.000
	Jackson	3.762	0.000	0.000	0.000	0.000	0.000
	Calumet	0.108	0.000	0.000	0.000	0.000	0.000
5/15-	Burnham	1.462	0.000	0.000	0.000	0.000	0.000
6/4	McCormick	1.648	*	*	*	*	*
	Jackson	1.532	0.000	0.000	0.000	0.000	0.000
	Calumet	*	*	*	*	*	*
6/5-	Burnham	1.964	*	*	*	*	*
6/25	McCormick	2.092	*	*	*	*	*
	Jackson	2.230	*	*	*	*	*
	Calumet	*	*	*	*	*	*
6/26-	Burnham	1.915	*	*	*	*	*
7/16	McCormick	1.646	0.000	0.000	0.000	0.000	0.000
	Jackson	1.723	*	*	*	*	*
	Calumet	*	*	*	*	*	*
7/17-	Burnham	2.504	0.000	0.000	0.000	0.000	0.000
8/6	McCormick	1.629	*	*	*	*	*
	Jackson	0.161	*	*	*	*	*
	Calumet	*	*	*	*	*	*
8/7-	Burnham	1.866	0.000	0.000	0.000	0.000	0.000
8/27	McCormick	1.737	0.000	0.000	0.000	0.000	0.000
	Jackson	0.752	*	*	*	*	*
	Calumet	*	*	*	*	*	*
8/28-	Burnham	0.670	0.000	0.000	0.000	0.000	0.037
9/17	McCormick	0.659	0.006	0.010	0.000	0.020	0.000
	Jackson	0.000	0.000	0.000	0.000	0.083	0.000
	Calumet	*	*	*	*	*	*
9/18-	Burnham	0.000	0.000	0.008	0.000	0.000	0.046
9/30	McCormick	0.095	0.000	0.000	0.000	0.000	0.016
	Jackson	*	0.000	0.000	0.000	0.000	0.000
	Calumet	*	*	*	*	*	*

Table 8. Catch rates by anglers using launched boats. For yellow perch, only data from anglers fishing for yellow perch were used. For the five salmonid species, only data from anglers fishing for salmonids were used. Asterisks represent instances when creel clerks found no anglers fishing for the species in question.

TIME PERIOD	AREA	CATCH PER ANGLER-HOUR					
		yellow perch	brown trout	rainbow trout	lake trout	coho salmon	chinook salmon
4/1-	Waukegan	*	0.002	0.000	0.000	0.638	0.006
4/23	Diversey	*	0.005	0.000	0.000	0.090	0.001
	Burnham	*	0.000	0.000	0.000	0.037	0.000
	Calumet	*	0.000	0.022	0.000	0.090	0.008
4/24-	Waukegan	*	0.006	0.002	0.000	0.532	0.010
5/14	Diversey	*	0.000	0.000	0.000	0.047	0.052
	Burnham	*	0.000	0.007	0.000	0.008	0.009
	Calumet	3.024	0.025	0.000	0.000	0.027	0.008
5/15-	Waukegan	*	0.004	0.006	0.003	0.117	0.005
6/4	Diversey	1.715	0.000	0.000	0.012	0.035	0.038
	Burnham	1.367	0.000	0.000	0.000	0.040	0.000
	Calumet	1.964	0.000	0.019	0.000	0.018	0.000
6/5-	Waukegan	3.266	0.001	0.002	0.005	0.039	0.013
6/25	Diversey	1.094	0.000	0.028	0.021	0.091	0.005
	Burnham	1.892	0.000	0.000	0.055	0.077	0.016
	Calumet	1.194	0.000	0.000	0.025	0.056	0.004
6/26-	Waukegan	2.175	0.000	0.023	0.022	0.013	0.012
7/16	Diversey	2.965	0.000	0.011	0.105	0.036	0.004
	Burnham	0.961	0.000	0.000	0.000	0.000	0.089
	Calumet	1.697	0.000	0.005	0.000	0.000	0.000
7/17-	Waukegan	0.248	0.013	0.013	0.017	0.016	0.034
8/6	Diversey	0.584	0.000	0.000	0.109	0.000	0.004
	Burnham	0.746	0.000	0.000	0.000	0.017	0.017
	Calumet	1.158	*	*	*	*	*
8/7-	Waukegan	0.000	0.001	0.004	0.007	0.009	0.028
8/27	Diversey	1.414	0.005	0.019	0.005	0.014	0.009
	Burnham	3.750	0.000	0.000	0.000	0.000	0.052
	Calumet	1.540	0.000	0.012	0.053	0.036	0.024
8/28-	Waukegan	0.000	0.008	0.001	0.001	0.022	0.023
9/17	Diversey	*	0.000	0.000	0.000	0.000	0.012
	Burnham	*	0.000	0.000	0.000	0.000	0.000
	Calumet	0.171	0.000	0.000	0.000	0.000	0.025
9/18-	Waukegan	*	0.010	0.001	0.010	0.019	0.020
9/30	Diversey	*	0.000	0.000	0.000	0.017	0.033
	Burnham	0.00	0.000	0.000	0.000	0.000	0.000
	Calumet	*	0.000	0.000	0.000	0.000	0.031

Table 9. Yield values. Yellow perch are assumed to be prepared as fillets with 60% waste and salmonids as whole gutted fish with 25% waste. Prices for all except brown trout are those current in November 1988.

SPECIES	TOTAL CATCH	AVE WT (lbs)	ROUND WT (lbs)	MARKET WT (lbs)	PRICE PER POUND	YIELD VALUE
yellow perch	1,838,341	0.22	404,435	161,744	\$8.99	\$1,454,966
brown trout	7,043	3.13	22,045	16,534	\$2.99	\$49,436
rainbow trout	6,439	4.97	32,002	24,017	\$3.69	\$88,623
lake trout	3,805	7.98	30,364	22,773	\$2.99	\$68,091
coho salmon	71,645	2.97	213,786	160,339	\$6.99	\$1,120,770
chinook salmon	13,841	8.51	117,787	88,340	\$6.99	\$609,546
COMBINED YIELD VALUE OF ALL SPECIES: \$3,391,432						

Table 10a. Average weights (coho salmon, chinook salmon, and rainbow trout). Weights are in pounds. Sample sizes (n) are shown. Seasons are defined by the following dates: spring = 4/1-5/14, early summer = 5/15-6/25, midsummer = 6/26-8/6, late summer = 8/7-9/17, fall = 9/18-11/30, winter = 12/1-3/31. Asterisks represent situations where no fish were measured.

SPECIES	ANGLER TYPE		Spring	-----Summer-----			Fall	Winter
				early	mid	late		
coho salmon	boaters	ave	2.40	3.70	5.40	5.72	5.52	*
		n	223	104	16	14	4	0
	pedestrians	ave	2.32	2.59	0.99	5.51	4.51	3.97
		n	209	4	1	10	10	1
	snaggers	ave	*	*	*	*	5.93	*
		n	0	0	0	0	9	0
	ice	ave	*	*	*	*	*	*
		n	0	0	0	0	0	0
chinook salmon	boaters	ave	8.02	7.24	8.47	10.51	9.01	*
		n	18	10	29	32	12	0
	pedestrians	ave	8.82	1.18	*	10.33	7.16	*
		n	6	5	0	21	31	0
	snaggers	ave	*	*	*	*	8.48	*
		n	0	0	0	0	31	0
	ice	ave	*	*	*	*	*	*
		n	0	0	0	0	0	0
rainbow trout	boaters	ave	6.51	6.04	6.50	6.06	4.42	*
		n	4	14	16	6	1	0
	pedestrians	ave	4.10	2.04	1.19	1.26	3.73	4.42
		n	26	4	5	3	17	18
	snaggers	ave	*	*	*	*	5.78	*
		n	0	0	0	0	3	0
	ice	ave	*	*	*	*	*	3.76
		n	0	0	0	0	0	4

Table 10b. Average weights (lake trout, brown trout, and yellow perch). Weights are in pounds. Sample sizes (n) are shown. Seasons are defined by the following dates: spring = 4/1-5/14, early summer = 5/15-6/25, midsummer = 6/26-8/6, late summer = 8/7-9/17, fall = 9/18-11/30, winter = 12/1-3/31. Asterisks represent situations where no fish were measured.

SPECIES	ANGLER TYPE		Spring	-----Summer-----			Fall	Winter
				early	mid	late		
lake trout	boaters	ave	*	8.34	8.03	6.95	8.83	*
		n	0	10	61	8	2	0
	pedestrians	ave	*	*	*	*	8.24	*
		n	0	0	0	0	3	0
	snaggers	ave	*	*	*	*	*	*
		n	0	0	0	0	0	0
	ice	ave	*	*	*	*	*	*
		n	0	0	0	0	0	0
brown trout	boaters	ave	3.69	5.57	4.06	5.91	1.70	*
		n	5	4	6	4	2	0
	pedestrians	ave	2.64	1.28	0.91	6.63	2.76	3.20
		n	57	5	3	4	9	24
	snaggers	ave	*	*	*	*	*	*
		n	0	0	0	0	0	0
	ice	ave	*	*	*	*	*	0.84
		n	0	0	0	0	0	1
yellow perch	boaters	ave	0.26	0.29	0.26	0.25	*	*
		n	22	136	95	20	0	0
	pedestrians	ave	0.19	0.22	0.23	0.22	0.21	0.19
		n	58	1380	1428	406	93	303
	ice	ave	*	*	*	*	*	0.19
		n	0	0	0	0	0	130

Table 11a. Fin clip summary (coho salmon, chinook salmon, and rainbow trout). Seasons are defined by the following dates: spring = 4/1-5/14, early summer = 5/15-6/25, midsummer = 6/26-8/6, late summer = 8/7-9/17, fall = 9/18-11/30, winter = 12/1-3/31. Occurrences of clips are shown separately for four types of anglers: boaters (b), pedestrians (p), snaggers(s), and ice fishermen (i).

SPECIES	CLIP	SPRING		-----SUMMER-----						FALL			WINTER	
				early		mid		late						
		b	p	b	p	b	p	b	p	b	p	s	p	i
coho salmon	ad	1	0	0	0	0	0	1	1	0	0	1	0	0
	ad,lv	0	0	1	0	0	0	0	0	0	0	0	0	0
	ad,rp	0	0	0	0	0	0	1	0	0	0	0	0	0
	do,rp	1	0	0	0	0	0	0	0	0	0	0	0	0
	ld,lv	0	0	0	0	0	1	0	0	0	0	0	0	0
	lm	8	8	13	0	0	0	0	0	0	0	0	0	0
	lm,rm	1	0	0	0	0	0	0	0	0	0	0	0	0
	lp	4	2	2	0	0	0	0	1	0	1	0	0	0
	lp,rp	1	0	0	0	0	0	0	0	0	0	0	0	0
	lv	0	0	1	0	0	0	0	0	0	0	0	0	0
	lv,rp	0	0	0	0	1	0	0	0	0	2	0	0	0
	lv,rv	0	0	0	0	0	0	1	0	0	0	0	0	0
	rm	5	6	2	0	1	0	0	0	0	0	0	0	0
	rp	21	8	2	0	0	0	2	3	0	1	3	0	0
	no clips	290	193	89	3	20	0	14	10	4	8	5	0	1
chinook salmon	ad	0	0	0	0	0	2	0	0	1	2	0	0	0
	lm	0	0	0	0	1	0	0	0	0	0	0	0	0
	lp	0	0	0	0	0	1	0	0	0	1	1	0	0
	lv	0	0	0	0	0	1	1	0	0	1	0	0	0
	rm	0	1	0	0	2	0	0	0	0	1	0	0	0
	rp	0	0	0	0	1	1	1	3	0	4	4	0	0
	rv	1	0	0	0	0	0	0	1	0	1	0	0	0
	no clips	17	5	10	5	34	22	40	27	9	59	27	0	0
rainbow trout	ad	0	0	0	0	1	0	0	0	0	0	0	0	0
	ad,lm,rp	0	0	0	0	1	0	0	0	0	0	0	0	0
	ad,rm	0	1	0	0	0	0	0	0	0	0	0	0	0
	do	0	2	0	0	0	0	0	0	0	0	0	0	0
	do,lv,rv	0	0	0	0	0	0	1	0	0	0	0	0	0
	lm	0	1	1	0	1	0	1	0	0	0	0	0	0
	lp	0	2	1	0	0	1	1	0	0	1	0	0	0
	lp,rp	0	0	0	0	0	2	0	0	0	2	0	1	0
	lv	0	0	0	0	0	0	0	0	0	0	0	1	0
	lv,rv	0	0	0	0	1	0	0	0	0	1	0	0	0
	rm	0	0	2	0	1	0	1	0	0	0	0	0	0
	rp	0	2	0	2	1	0	1	0	0	2	1	0	1
	no clips	4	18	10	1	18	2	5	2	0	16	2	16	4

Table 11b. Summary of fin clips (lake trout and brown trout). Seasons are defined by the following dates: spring = 4/1-5/14, early summer = 5/15-6/25, midsummer = 6/26-8/6, late summer = 8/7-9/17, fall = 9/18-11/30, winter = 12/1-3/31. Occurrences of clips are shown separately for four types of anglers: boaters (b), pedestrians (p), snaggers(s), and ice fishermen (i).

		SPRING		-----SUMMER-----						FALL			WINTER	
				early		mid		late						
SPECIES	CLIP	b	p	b	p	b	p	b	p	b	p	s	p	i
lake trout	ad	0	0	0	0	2	0	0	0	0	0	0	0	0
	ad,do	0	0	0	0	1	0	0	0	0	0	0	0	0
	ad,lp	0	0	3	0	9	0	4	0	1	0	0	0	0
	ad,lv	0	0	1	0	1	0	0	0	0	3	0	0	0
	ad,rp	0	0	1	0	5	0	0	0	0	0	0	0	0
	ad,rv	0	0	1	0	3	0	3	0	0	0	0	0	0
	do	0	0	0	0	4	0	0	0	0	1	0	0	0
	do,lp,rp	0	0	0	0	0	0	0	0	0	1	0	0	0
	lp	0	0	2	0	9	0	2	0	1	0	0	0	0
	lp,lv	0	0	0	0	0	0	1	0	0	0	0	0	0
	lp,rp	0	0	0	0	2	0	0	0	0	0	0	0	0
	lv	0	0	1	0	3	0	1	0	0	0	0	0	0
	lv,rp	0	0	1	0	2	0	0	0	0	0	0	0	0
	lv,rv	0	0	1	0	5	0	0	0	0	0	0	0	0
	rp	0	0	0	0	8	0	1	0	0	0	0	0	0
	rv	0	0	0	0	10	0	2	0	0	1	0	0	0
	no clips	0	0	1	0	2	0	2	0	1	0	0	0	0
brown trout	ad	0	1	0	0	0	0	0	1	0	0	0	0	0
	ad,lm	0	0	0	0	0	0	0	0	0	1	0	0	0
	ad,lp	0	2	0	0	1	0	0	0	0	0	0	0	0
	ad,lp,lv	1	0	0	0	0	0	0	0	0	0	0	0	0
	ad,lv	0	3	0	0	0	0	0	0	0	0	0	0	0
	do	0	0	0	0	0	0	0	0	0	1	0	0	0
	do,lp	0	1	0	0	0	0	0	0	1	0	0	0	0
	do,rv	0	1	0	0	0	0	0	0	0	0	0	0	0
	lm	1	1	1	0	0	0	0	0	0	0	0	0	0
	lp	0	2	0	1	1	1	0	0	0	1	0	0	0
	lp,rp	0	0	1	0	0	0	1	1	0	0	0	0	0
	lv,rv	0	1	0	0	0	0	1	0	0	0	0	0	0
	rm	0	0	0	0	1	0	0	0	0	0	0	0	0
	rp	1	0	1	1	0	0	0	0	0	0	0	0	0
	rp,lp	0	5	0	0	0	0	0	0	0	0	0	2	0
	rv	0	1	0	0	0	0	0	0	0	0	0	0	0
	no clips	2	41	1	3	3	2	4	2	0	7	0	22	1

IV DISCUSSION

Comparison with 1986 and 1987

These results can be compared with those from 1986 and 1987 (Tables 12 and 13). Yellow perch catch was high in all years; it was just under 1.8 million in 1986, slightly more in 1987 and 1988. The harvest of coho salmon which had declined markedly in 1987 recovered somewhat in 1988, with Waukegan Harbor providing by far the best fishing. Fishing for chinook salmon was extremely poor in 1988. Estimated expenditures for boats, motors, and trailers, jumped markedly between 1987 and 1988. Tables 12 and 13 summarize these and other results from our 1986 and 1987 creel surveys. Creel survey methods were different in the three years, so comparisons should be made with caution, especially where estimates for anglers using moored boats are concerned.

Table 12. Effort and expenditures in 1986, 1987, and 1988.

TYPE OF ANGLER		YEAR	EFFORT (angler- trips)	EXPENDITURES		
				major (boat etc)	minor (gear)	other (travel)
<u>SUMMER</u>						
Pedestrians	1986	299,454	\$0	\$844,000	\$397,000	
	1987	289,307	\$0	\$1,674,000	\$475,000	
	1988	250,251	\$0	\$1,133,004	\$416,962	
Launched Boats	1986	71,009	\$2,079,000	\$1,598,000	\$131,000	
	1987	54,043	\$2,427,000	\$618,000	\$119,000	
	1988	58,009	\$8,060,739	\$614,227	\$123,096	
Moored Boats	1986	74,307	\$2,022,000	\$2,395,000	\$138,000	
	1987	28,911	\$996,000	\$363,000	\$60,000	
	1988	36,162	\$5,506,033	\$391,888	\$77,949	
<u>WINTER</u>						
Pedestrians	1986	22,141	\$0	\$225,000	\$56,000	
	1987	33,629	\$0	\$260,000	\$77,000	
	1988	20,137	\$0	\$98,396	\$43,130	
Snaggers	1986	7,716	\$0	\$26,000	\$18,000	
	1987	9,247	\$0	\$47,000	\$15,000	
	1988	15,007	\$0	\$102,182	\$43,552	
Ice fishermen	1986	5,323	\$0	\$20,000	\$18,000	
	1987	3,325	\$0	\$12,000	\$6,000	
	1988	5,119	\$0	\$36,820	\$7,815	
TOTALS	1986	479,950	\$4,101,000	\$5,108,000	\$758,000	
	1987	418,462	\$3,422,324	\$2,975,637	\$751,358	
	1988	384,685	\$13,566,722	\$2,376,518	\$712,504	

Table 13. Effort and catch in 1986, 1987, and 1988.

ANGLER TYPE and YEAR		EFFORT (angler- hours)	CATCH					
			yellow perch	brown trout	r'bow trout	lake trout	coho salm'	chin salm'
SUMMER								
Peds	1986	1,278,678	1,614,979	5,478	2,914	171	20,415	5,455
	1987	1,252,796	1,715,219	10,982	2,486	55	13,101	9,066
	1988	1,077,816	1,636,985	4,912	2,346	33	17,577	3,815
Lau'd	1986	386,287	53,316	2,094	2,849	1,030	43,539	11,856
	1987	285,076	84,172	690	811	2,299	14,861	8,266
	1988	304,547	73,999	836	1,545	2,188	32,016	3,556
Moo'd	1986	404,232	24,973	1,633	3,772	641	52,219	12,482
	1987	151,770	20,964	330	444	1,286	8,855	4,057
	1988	189,847	36,044	520	922	1,516	20,530	2,237
WINTER								
Ped	1986	88,348	20,811	784	760	0	600	915
	1987	159,131	2,567	2,947	2,849	42	6,371	693
	1988	86,792	50,200	699	1,087	69	889	826
Snag	1986	30,555	57	174	181	54	1,025	2,100
	1987	39,745	0	23	1,144	0	263	6,513
	1988	67,381	0	0	296	0	633	3,408
Ice	1986	16,348	65,106	0	106	0	0	0
	1987	16,406	319	0	102	0	0	0
	1988	25,546	41,114	75	243	0	0	0
TOTALS	1986	2,204,448	1,779,242	10,163	10,582	1,896	117,798	32,808
	1987	1,904,924	1,823,241	14,972	7,846	3,682	43,451	28,595
	1988	1,751,929	1,838,341	7,043	6,439	3,805	71,645	13,841

The most important differences between the methods of collecting and analyzing data used in these three years are these: (1) In 1986 six pedestrian areas and three launch areas were visited for interviews; in 1987 and 1988 eight pedestrian areas and four launch areas were visited. Thus higher proportions of total catch, effort, and expenditures were estimated directly in 1987 and 1988 than in 1986, and lower proportions were estimated by extrapolation to areas that were not visited. (2) Several parameters used in deriving estimates are themselves estimated, and the estimated values were different in the three years. Table 14 lists the values of these parameters used each year. (3) The formulae for extrapolating catch, effort, and expenditures by anglers using launched boats to estimate those things for anglers using moored boats were quite different in the three years. This occurred because the estimated ratios of moored boat traffic to launched boat traffic for Diversey Harbor and Burnham Harbors changed greatly between 1986 and 1988 (Table 14) as new data became available.

Table 14. Parameters used in deriving estimates for 1986, 1987, and 1988.			
PARAMETER	1986	1987	1988
Duration of fishing trip (hours)			
summer pedestrians	4.27	4.31	4.31
snaggers	3.96	4.49	4.49
ice-fishermen	3.07	4.99	4.99
winter pedestrians	3.99	4.31	4.31
launched boats	5.44	5.25	5.25
Number of anglers per launched boat	2.91	2.77	2.77
Ratio of number of launched boats returning in a day to the number returning between 11:00 a.m. and 1:00 p.m.	3.125	2.94	3.13
Ratio of number of moored boats used for fishing on any day to number of launched boats used for fishing			
Waukegan Harbor	0.82	0.83	0.83
Diversey Harbor	2.39	1.54	0.92
Burnham Harbor (East)	no est	0.34	1.38
Distributions of pedestrian anglers, launched boats, and moored boats (Tables 1 and 2).	Differences between years were slight.		

Confidence Intervals and Bias

Estimates of catch, effort, and expenditures are presented above without confidence intervals. Confidence intervals presented without estimates of bias are meaningful only if bias is assumed to be negligible, an assumption that we are not willing to make. Although we have collected and will continue to collect data with which to partially assess biases, we are presently unable to make such assessments. Table 14 lists the parameters used in our estimation procedures. Those parameters, to the extent that they are incorrect, introduce bias into the estimation process. Other sources of bias in this survey include the assumption that fishing effort and catch rates during the times of our interview sets (6:00 a.m. to 8:00 a.m. or 8:30 a.m. to 10:00 a.m. for pedestrians; 11:00 a.m. to 1:00 p.m. for launched boat anglers) are, on average, representative of the entire day.

V REFERENCES

- Cochran, W.G. 1977. Sampling techniques, 3rd ed. John Wiley and Sons, New York. 428 pp.
- Horns, W.H. 1988. A survey of sportfishing in the Illinois portion of Lake Michigan - April 1987 through March 1988. Aquatic Biology Technical Report 88/7. Illinois Natural History Survey, Champaign, Illinois, 37 pp.
- Horns, W.H., and R.W. Gorden. 1986. A sport fishing creel survey of the Illinois portion of Lake Michigan. Aquatic Biology Technical Report 86/3. Illinois Natural History Survey, Champaign, Illinois, 46 pp.
- Horns, W.H., and R.W. Gorden, 1988. A sport fishing creel survey of the Illinois portion of Lake Michigan. Aquatic Biology Technical Report 88/2. Illinois Natural History Survey, Champaign, Illinois, 46 pp.
- Malvestuto, S.P. 1983. Sampling the recreational fishery. Pages 397-419 in L.A. Nielsen and D.L. Johnson, eds., Fisheries Techniques. American Fisheries Society. Bethesda, Maryland. 1983.
- Muench, B. 1981. 1979. Sport fishing creel survey on the Illinois portion of Lake Michigan. Division of Fisheries, Illinois Department of Conservation (mimeo). 25 p.

VI APPENDIX A - DATA FORM AND INSTRUCTIONS TO CLERKS

Interviews are obtained in sets. For each set, you visit a site and interview a number of angling parties. Each interview involves data for an entire angling party, although you might only speak with one individual angler. The interviews are taken from pedestrian anglers or from boaters returning to a launch ramp.

When pedestrian anglers are being interviewed, interview either all present or all that can be interviewed in the assigned period (usually two hours). Counts of pedestrian anglers are made at the start and finish of the interview set. When all pedestrian fishing parties cannot be interviewed, interview a **representative** sample of the anglers present. Thus, if the site includes harbor, shore, and structure areas (see maps), you interview parties from all three areas in proportion to their numbers. Approach all types of people (men, women, Chinese, hispanic, white, polite, surly, etc.) without special favor for or against any. To assure impartiality skip a fixed number of angling parties between interviews, with the number to skip determined so that the entire site is covered during the interview period. If you encounter an angling party that has already been interviewed in our creel survey that day, skip them.

When boaters are interviewed, stay at the ramp for a predetermined time (usually two hours) and record data for **all** returning boats. Sometimes it is not possible to interview all angling boats. When that happens, you will interview a representative sample of boats containing anglers. When a boat is not interviewed, you record an ID number (see below), the time (under "interview time"), and one of four notes (in the right-hand margin): "ANI" (anglers - no interview), "PNA" (power - no anglers), "SAIL" (sail boat), and "CH" (charter fishing boat). Counts of trailers are made at the start and finish of the interview period. It is important that the counts indicate the number of trailers at the exact times when you start and finish your interview set. Sail boats, non-angling power boats, and charter boats are never interviewed.

The interview form has four areas for recording data: 1) Site Data, 2) Party Record, 3) Catch Record, and 4) Fish Record.

1) **Site Data.** This area is a condensed version of the **Instantaneous Counts Form**. Counts are recorded at the start and finish of each interview set. Remember the rule: "Fill in the blanks". When conducting boat interviews, record slashes in the pedestrian spaces. When conducting pedestrian interviews of any kind, enter a slash in the trailers space. When conducting pedestrian interviews with "regular peds", always enter slashes for all three types of "special peds", and vice-versa.

2) **Party Record** and 3) **Catch Record.** These areas are filled-in during the interviews. Column headings are explained here:

ID - Interviews (and non-interviewed boats) are sequentially numbered. For pedestrians, assign a number to each pedestrian party interviewed. For boaters, assign a number to each boat that returns to the ramp, including those that are not interviewed. Each clerk assigns one series of numbers each day, no repeats. Thus, for example, when you conduct more than one

interview set in a day, **do not** begin the second set with number 1; continue numbering where you left off in numbering the previous set. **Also**, for interview sessions at boat ramps, record the registration number of each boat.

angler type - One of eight mutually exclusive possibilities is circled: har (harbor), sho (shore), str (structure), lau (launched), sna (snagger), smt (smelter), ice (ice-angler), and moo (moored).

angers - For each party record the total number of anglers (tot) and the number who are Illinois residents (res). Remember, as in the **Instantaneous Counts Form**, include members of the angling party who are not fishing at the moment.

lines - For each party record the number of fishing rods (rod) and the number of power lines (pwr) in use by that party. Trolley lines are counted as power lines here.

nets - For smelt fishing parties record the number of gill nets, the number of dip nets, and the number of seines.

trip times - Record three times: the time the fishing trip started, the time of the interview, and the time the trip ended (or is expected to end). **Always record times in 24-hour time** (e.g., two o'clock p.m. is 1400). When the fishing trip has started the previous day, still record the time of day that fishing started. Fishing trips by pedestrians are considered to start when the angling party arrives at the shoreline. Fishing trips using boats are considered to start when the boat leaves the ramp and to end when the boat arrives back at the ramp.

expenses - Three specific items are recorded. Remember, the data you record applies to the entire party being interviewed. You record only costs of items acquired since the last fishing trip on Lake Michigan. If this is the first trip that an angler has **ever** made to Lake Michigan, include the total purchase price of all items in each category, regardless of when purchased. Notice that we are not concerned with when the item was paid for, only with when it was acquired and what it cost. 1) For major expenses (maj), record the purchase price of boat, motor, and/or trailer, **if acquired since the last fishing trip on Lake Michigan**. Include newly purchased used equipment. 2) For minor expenses (min), record the purchase price of any fishing gear (rods, reels, downriggers, line, hooks, lures, bait, nets, etc.) purchased since the last fishing trip on Lake Michigan. Include only things directly used in the capture of fish. Do not include sonar equipment, food and drink, and items for the boat. 3) In the column headed "other", record the estimated cost of driving to this fishing site. Here we assume a cost of ten cents per mile, so you simply record the round trip mileage divided by ten. This should be the **total** round trip distance for all cars used for this trip by members of the fishing party.

sought - Record species sought as p (perch), s (salmonid), ps (perch or salmonid or "anything"), or o (other specific target species).

numbers in possession - Record only the numbers of fish in possession of the angling party. BK - brook trout, BN - brown trout, RB - rainbow trout, LT - lake trout, CO - coho salmon, CH - chinook salmon, YP - yellow perch, SM - smallmouth bass, NP - northern pike. **Accurate identification is extremely important; don't hesitate to use your key if you have any doubt about the identification of any fish.** If the fish in possession of an angling party include some caught at any other site, exclude those from the numbers recorded here.

(no heading) - Ask the angler how many floy tags he/she has seen on perch presently in possession. Record that number here.

4) **Fish Record.** Here you record physical measurements made in connection with the interviews. Above this section you record the time your interview set was scheduled to start (usually 0600, 0830, or 1100). You should be able to weigh, measure, and examine for clips (for purposes of this form, we count floy tags under the heading "clips"), scars, and wounds on **all** salmonids that you encounter in possession of anglers. When an angler has more than 5 yellow perch, select five fish **at random** from the catch to weigh, measure, and examine for floy tags (you don't need to look for clipped fins or lamprey marks on yellow perch). In addition to the five randomly selected perch, record data for any other yellow perch on which the angler has found a floy tag. On some occasions anglers will have removed floy tags from fish before you arrive. If it is not possible to know which specific fish the tag came from, record all information printed on the tag in the margin of the form and **keep the tag**. Column headings are explained here:

ID - Record the same number recorded in "Party Record" for the angling party that caught this fish.

species - Record the two-letter code indicating the species. The abbreviations are those that appear as headings in the "Catch Record" section.

weight - Record the weight of the fish **in grams**. Do not record weights of gutted or beheaded fish. Be sure to "zero" the scale and to use the appropriate scale for the size of the fish being weighed.

length - Record total length (distance from tip of snout to tip of tail) **in centimeters**.

clipped fins - As outlined above you will examine **all** salmonids for clipped fins and floy tags, and you will examine **some** yellow perch for floy tags only. You record abbreviations for what you find (for purposes of data recording, assume that perch never have clipped fins or lamprey scars or wounds). The permitted entries are do (dorsal), ad (adipose), lp (left pectoral), rp (right pectoral), lv (left ventral), rv (right ventral), an (anal), fl (floy tag), lm (left maxillary), rm (right maxillary) and none. **Also**, when you encounter a floy tag, record all the information printed on the tag. **Remember**, leave no blank spaces on the form; if you are unable to examine the fish, draw diagonal slashes through the spaces.

scars and # wounds - This refers to marks left by sea lampreys; we are not interested in scars and wounds from other causes. The distinction is that wounds are still all or partly red, while scars are not. Since yellow perch are not examined for scars and wounds, always draw slashes through these boxes for perch.

[illegible]

TIME (start time of interview set): _____

FISH RECORD						
ID	SPECIES	WEIGHT (g)	LENGTH (cm)	CLIPPED FINS	# SCARS	# WOUNDS

VII APPENDIX B - PROJECT F-52-R3 PERFORMANCE REPORT

The foregoing report does not directly discuss progress toward each of the specific objectives listed in the AFA for this project. The purpose of this appendix is to list the jobs defined in that AFA and to comment on progress toward the objectives of those jobs.

Job 1. Census design

Objective: To specify procedures and design a sampling schedule for a creel census of pedestrian and boating anglers.

Progress: A complete set of procedures is in place. All aspects of the survey are subject to continuing review.

Job 2. Interviews and instantaneous counts

Objective: To collect data needed to estimate (for pedestrian anglers and boating anglers) the amount of fishing taking place, the numbers of fish caught, the numbers of stocked fish caught, the catch per unit of effort, and the expenditures for fishing. The only elements of Illinois' Lake Michigan sport fishery not covered here are the smelt fishery (see Job 5) and the charter boat fishery (covered separately by the IDOC).

Progress: As shown in the foregoing report, this objective was met.

Job 3. Aerial counts

Objective: To estimate the numbers of pedestrian anglers at locations other than the fishing sites routinely visited.

Progress: This objective was accomplished using several helicopter flights over the entire Illinois shoreline.

Job 4. Fishing contest survey

Objective: To determine effort and harvest by organized fishing contest participants.

Progress: Our estimates of total effort and harvest include effort and harvest by fishing contest participants.

Job 5. Smelt fishing survey

Objective: To obtain an estimate of the activity of and harvest by smelt fishermen.

Progress: This objective was met through interviews conducted at Waukegan Harbor. Data are summarized in the foregoing report.

Job 6. Moored fishing boat activity

Objective: To determine the amount of fishing and the harvest from boats kept at moorings.

Progress: The report provides estimates of the catch, effort, and expenditures by boaters using boats kept at moorings.

Job 7. Fishing expenditures

Objective: To determine detailed information about fishing-related expenditures of anglers of all types.

Progress: The report provides the desired estimates.

Job 8. Growth and diet of sport fish

Objective: To estimate, using extensive samples obtained separately, the growth rates and diets of yellow perch available to anglers in Illinois and neighboring states.

Progress: As reported in the Segment II Annual Report, I have concluded that adequate and reliable growth and diet information cannot be obtained through the creel survey interviews without compromising other objectives.

Job 9. Data computerization

Objective: To develop a computerized system of data entry, checking, and summarization that can be used without special training.

Progress: A complete data processing system is in place and subject to regular review and improvement.

Job 10. Analysis and reporting

Objective: To develop reports summarizing all data.

Progress: This report represents the achievement of this objective.